

Agaristidæ.

Eusemia Watersii, sp. n.

Most nearly allied to *E. Belangerii* from Java and *E. zea* from Madagascar. Primaries dark chocolate-brown, crossed beyond the middle by an oblique primrose-yellow band, which does not reach the margins; a white dot on the fringe at apex: secondaries black, with chocolate-brown reflections; a large rounded carmine patch occupying the whole central area, from the subcostal vein to the abdominal margin; its extreme edge towards costa ochraceous; abdominal fringe also ochreous at the base; fringe of outer margin white at apex: head and collar black, spotted with primrose-yellow; thorax black; abdomen ochreous, crossed by black lines, which emit a dorsal tapering stripe on each segment, last two segments almost wholly black; legs, base of wings below, and under surface of body bright ochreous. Expanse of wings 56 millim.

Betsileo country (*T. Waters*). Type Brit. Mus.

LI.—*Local Colour-varieties of Scyphomedusæ: a new Species produced in Forty Years.* By R. VON LENDENFELD, Ph.D.

THE colours of the large Medusæ are as variable as they are brilliant, and we generally find the same species in a long series of finely-toned colour-varieties.

I have observed two species of large Medusæ (*Cyanea annaskala*, R. v. L., and *Crambessa mosaica*, H.), which, although they vary very much in their colour, do not appear in a series of connecting varieties, but rather as "beginning species," inasmuch as the colour in these varieties is quite constant in the different-coloured Medusæ met with in different localities.

I have found these two species in Port Phillip, south coast, and in Port Jackson, east coast. Although these two places are not far apart, still the water is very much warmer in the latter harbour than in the former. This is owing to the nature of the ocean-currents. A warm equatorial current which passes along the eastern coast of Australia supplies Port Jackson with warmer and, probably, saltier water than that with which Port Phillip is filled. A cold polar current flows past the entrance to Port Phillip.

I have found occasion to draw attention to the fact that *Crambessa mosaica* in Sydney was brown, whilst in Melbourne the same species always appeared deep blue. The brown colour is not always of the same depth and of similar hue all over the surface of the Medusa, but varies from the colour of white bread to that of coffee. The cause of this colour is to be found in small yellow cells, which appear in more or less dense clusters all over the surface. These cells are parasitic Algæ known as *Zooxanthella*. It does not appear unlikely that they may be the young stages of ordinary Laminarians.

Such *Zooxanthellæ* are very common in jelly-fish, sponges, &c., all over the world. Also in Port Phillip I obtained numerous Actiniæ which were infested by them. The *Crambessa mosaica* of Melbourne, however, never shows a trace of a *Zooxanthella*, and so retains its original blue colour.

In the harbour of Sydney, on the other hand, *Zooxanthellæ* which appear identical with those in Melbourne are found in great masses in all *Crambessæ*. In Sydney as well as in Melbourne I had occasion to see many thousand specimens, and I found that the Melbourne variety was always blue, but that the Sydney species was not absolutely always quite brown.

With the trawl we sometimes brought up *Crambessæ* from depths of 10 or 20 metres which did not show the brown colour very distinctly, and it appeared that only a few masses of *Zooxanthellæ* could be detected with the magnifying-glass. In every case some yellow cells were present.

I think that I might be justified in considering the difference between the Sydney and Melbourne species as sufficient to make two varieties of them.

In the cold water of Port Phillip it appears not to be advantageous for the Medusæ or the Algæ to live symbiotic, whilst this does appear to be the case in the warm water of Port Jackson. The Melbourne variety, which I name *Crambessa mosaica conservativa*, is blue, and has apparently retained the habits of its ancestors. The Sydney variety, which I shall name *Crambessa mosaica symbiotica*, has given up this mode of life, and has taken to live together with a *Zooxanthella*. The difference between the two is evidently the same as that between fungi and lichens. Should the variety *symbiotica* adapt itself, in the ordinary course of natural selection, so wholly to this symbiotism as not to be able to live without the *Zooxanthella*, a new species will have been formed, which may perhaps be the case already.

Crambessa mosaica has been described by several authors. All the specimens were collected near Sydney, and the species

is described as blue to grey. No one mentions the bright brown colour, which is so very striking. The latest of these observers was T. Huxley, in the year 1845. Has the change taken place since that time? Have we to assume that a new species or variety has been produced within the last forty years?

If this paper should be read by any one who has access to the original type specimens of Quoy et Gaimard or Huxley it would be well worth while to examine them, so as to find out whether they can detect any *Zooxanthellæ* in them or not.

Two years ago I described a most beautiful Medusa of Port Phillip as *Cyanea annaskala*, R. von L. Although this species appears in millions in the place mentioned, there is no record of its having been found anywhere else, and I also have not found it in any other locality until lately. In September a few specimens appeared in Port Jackson, which, though slightly different in colour and size, must doubtlessly be referred to my species *Cyanea annaskala*. Whilst the Melbourne specimens appeared never to grow beyond 10 centims. in diameter, the Sydney specimens attain a diameter of 20 centims. and more. There is hardly a doubt that this Medusa grows to a larger size in the warmer water of the equatorial current than in the cold water that comes from the South Pole, the fauna of which is comparatively poor. There exists also a difference in the colour of the mouth-arms. The Melbourne specimens possess mouth-arms which are deep purple throughout, whilst the purple colour in the Sydney specimens is found only at margin.

The margin, which is much thicker than the proximal parts of the mouth-arms, consists of a number of cells in the ectoderm, which is here composed of many layers. The pigment is found in these cells exclusively, and not also in the supporting lamella, as in the Melbourne specimen.

Among the thousands of specimens which I examined at Melbourne I did not find a single form which might be considered as a transitional variety. The mouth-arms of all had quite the same colour—a fact to which I drew attention at the time, as also the few Sydney specimens which I found were constant in this particular. I consider myself justified in setting up provisionally two varieties of this species:—

Cyanea annaskala purpurea, found as yet only in Port Phillip, with mouth-arms which are richly purple throughout; and *Cyanea annaskala marginata*, found as yet only in Port Jackson, with mouth-arms which are purple at the free margin, but otherwise appear colourless.

The purple colour in the mouth-arms is very similar to the

brilliant purple ("Sehpurpur") in the sensitive apparatus of the retina of some animals, particularly the lizard. When the *Cyanea* is placed in a glass aquarium this colour fades in less than an hour to a dirty brick-red. When the Medusa is sick, even in the open sea, it is always this colour which is affected first, and turns into a dirty coffee-colour long before the tentacles begin to drop off, which is always a sign of approaching death.

In my paper on the structure of *Cyanea annaskala* I pointed out that no pigment occurs in the marginal bodies, and that therefore the organs of sight of this species, if to be found in the marginal bodies at all, were not nearly so highly developed as in the other Medusæ, or even as in other species of the same genus which *do not possess purple mouth-arms*.

Sensitive cells are very numerous, particularly in the purple margin, and *contain* the purple substance. Ganglion-cells are also met with there. The pigment in the other parts might be considered as reserve material for that which may perhaps be used up by the sensitive cells. I do not go so far as to draw the conclusion which the reader will have inferred from the preceding lines; but I should like to hint at the possibility of the mouth-arms of our Medusa being able to perceive light.

LII.—*Notes on Hawaiian Neuroptera, with Descriptions of new Species.* By the Rev. THOMAS BLACKBURN, M.A.

SOME years ago I sent a small collection of Hawaiian species of this order to Mr. McLachlan, concerning which a remarkably interesting paper from that gentleman's pen appeared in the Ann. & Mag. Nat. Hist. for October and November 1883. It was at the time a matter of much regret to me that the number of specimens I was able to send Mr. McLachlan was very meagre, owing, I think, to the fact that the Neuroptera occupy only a secondary place in my studies, rather than to their being of rare occurrence on the archipelago. Since the appearance of the above-mentioned paper my scanty leisure time has been devoted to describing new Hawaiian Coleoptera; but as that work is now completed (so far as my materials go), I think it might not be without interest if I were to pass in review the results of my exploration, not hitherto published, in the other orders. In doing so I shall not attempt to name and describe species, except where they happen to have very salient characters, but shall content myself with indicating their affinities in general terms, leaving their more precise disposal for the possibilities of the future. I pro-